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LAND USE MAPPING AND MODELLING FOR THE PHOENIX QUADRANGLE

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Type I Progress Report for Period 1 March 1973 - 30 April 1973

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Prepared for:

Goddard Space Flight Center
Greenbelt, Maryland 20771

Type I Progress Report

ERTS-1

1 March 1973 - 30 April 1973

- a. Land Use Mapping and Modelling for the Phoenix Quadrangle. (ERTS-A Proposal SR-186)

b. IN-057

- c. Statement and explanation of any impedance:

Only one MSS band 7 image has yet been received. Copies of MSS frame sets and transparencies have been ordered from NASA Goddard by ERTS Data Request Form. A revised Product Order Form has also been sent to NASA Goddard during the reporting period. No cloud-free sets (bands 4, 5, 6 and 7) have yet been received showing most of the Phoenix (Arizona) Quadrangle test site in one view, although partial sets have been received. More cloud cover than anticipated has apparently resulted in very few images being received for the late fall and winter periods which cover the test site. Only one image covering the Phoenix metropolitan area has been received since early November. High altitude aircraft underflight photography requested a year ago for checking the accuracy of interpretation of land use data from ERTS imagery has not yet been received.

- d. Accomplishments during the reporting period and those planned for the next period:

The MSS 9 x 9 image which became available during the reporting period has been examined on a Bausch and Lomb Zoom Transferscope at 4x magnification, an I²S Color Additive Viewer, a Richardson Film Projection Viewer at 10x magnification, and in microfiche viewers at 12x and 18x magnification. Using an optional 4x

magnification lens to view the back lighted image on the horizontal viewing surface of the Zoom Transferscope and zoom enlarging the back lighted image on the vertical viewing surface to 4x magnification, a composite image has been formed at a scale of approximately 1:250,000. Initial investigation suggests that setting up two images in the same spectral band from different time periods in this manner and then using a "quick flip" technique to view alternately identical areas on the frames allows changes to be detected quickly in complex urban fringe areas. Illumination limitations of the Zoom Transferscope tend to limit the effectiveness of these techniques with denser ERTS images.

A 9.5 inch false-color composite transparency has been prepared from 9.5 inch MSS band 4, 5, and 7 imagery by diazo copying methods. The frame covers the eastern portion of the test site, including metropolitan Phoenix, during mid-February. Diazo color film transparencies have been prepared from each MSS band (yellow from band 4, magenta from band 5, and cyan from band 7) and registered to create a false-color composite. 70 mm chips have been cut from 9.5 inch transparencies of MSS band 4, 5 and 6 imagery for viewing in an I²S Color Additive Viewer. The MSS band color composites have been most useful for discriminating cropland from either rangeland or urbanized areas in the test site.

During the next reporting period, further experimentation will be conducted to determine the effects of seasonal vegetation change on land use change detection. This will be dependent upon imagery being received covering the test site during the spring months. Data to be received as a result of the revised Product Order Form and ERTS Data Request Form recently submitted will allow a comprehensive review of seasonal changes affecting land use change detection which have occurred in the test site since late summer to commence. Work will also begin, using high altitude aerial photography covering portions of the test site to check the accuracy of land use changes previously detected from ERTS imagery. A complete check of the test site will be accomplished when previously requested underflight photography covering the entire Phoenix Quadrangle is received.

e. Scientific results and practical applications:

Comparison of 9 x 9 MSS band images and color composites made from bands 4, 5, and 6 showing vegetated areas near Phoenix during the summer, fall and winter seasons aided in definitely establishing that certain land areas were being used as agricultural land and not as rangeland. Agricultural land, which appeared to be fallow, idle, or not irrigated, often became more readily identifiable as agricultural land when comparing different images of identical land areas which have been affected by seasonal vegetation changes. Experimentation with the Bausch and Lomb Zoom Transferscope using MSS images of identical areas in the same spectral band from different

time periods, with a "quick flip" method of alternately viewing the frame areas, enabled rapid detection of a major land use change from agricultural to urban use on the northwest fringe of the metropolitan Phoenix area. The best results in this case were obtained when comparing MSS band 5 images.

Examination of MSS transparencies and color composites allowed further updating of a map of land use change in the Phoenix Quadrangle. (Category 2H, Land Use Survey and Mapping, General)

f. Published reports or talks:

"Change in Land Use in Phoenix (1:250,000) Quadrangle, Arizona, between 1970 and 1972: Successful Use of a Proposed Land Use Classification System," by John L. Place, U.S. Geological Survey, Geographic Applications Program, Washington, D.C., was presented at the Symposium on Significant Results Obtained from ERTS-1 at New Carrollton, Maryland, on March 6, 1973.

g. Recommendations for improvement:

It would be advantageous to send out all four bands of ERTS MSS imagery to those principal investigators requiring color infrared composites for their work. Although the 9.5 inch transparencies are useful, some distribution of the 70 mm images might help also in allowing a broad overview in the Color Additive Viewers.

h. Changes in Standing Order Forms:

A revised ERTS Product Order Form was submitted to Arthur W. Fihelly, ERTS Technical Monitor, on April 17, 1973. Imagery was requested for every pass that qualifies on the basis of a maximum acceptable cloud cover of 20%. MSS bands 4, 5, 6 and 7 were requested in bulk black and white transparencies,, both 9.5 inch and 70 mm for use in color additive viewers. This revised Product Order Form should enable us to receive the data required to make a more complete and comprehensive analysis of land use change in the test site than has been possible with the imagery received up to now.

i. ERTS Image Descriptor Forms:

ERTS Image Descriptor Forms are attached at the end of this report.

j. Changed Data Request Forms submitted to Goddard Space Flight Center/NDPF:

An ERTS Data Request Form was submitted to Goddard Space Flight Center/NDPF on April 9, 1973. MSS imagery in several different product formats was ordered retrospectively. This was the first ERTS Data Request Form to be submitted since the initial Product Order Form was submitted over a year ago.

(See Instructions on Back)

ORGANIZATION Geographic Applications Program, USGS

ID _____

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
	Agricult	Rangelnd	Urban	
121117332		x		LAKE
121117334	x	x	x	

***FOR DESCRIPTORS, WHICH WILL OCCUR FREQUENTLY, WRITE THE DESCRIPTOR TERMS IN THESE COLUMN HEADING SPACES NOW AND USE A CHECK (✓) MARK IN THE APPROPRIATE PRODUCT ID LINES. (FOR OTHER DESCRIPTORS, WRITE THE TERM UNDER THE DESCRIPTORS COLUMN).**

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